

### **LP-IV Sample Problem Statement**

1. Implementing Feedforward neural networks with Keras and TensorFlow for classification of hand-written MNIST dataset using below steps:
  - a. Import the necessary packages
  - b. Load the training and testing data
  - c. Define the network architecture using Keras
  - d. Train the model using SGD with 11 epochs
  - e. Evaluate the network
  - f. Plot the training loss and accuracy
  
2. Implement the Image classification CNN model for classifying hand-written MNIST dataset by dividing the model into following 4 stages:
  - a. Loading and preprocessing the image data
  - b. Defining the model's architecture
  - c. Training the model
  - d. Estimating the model's performance
  
3. Build Feedforward neural networks with Keras and TensorFlow for classification of CIFAR10 image dataset using the following steps:
  - a. Import the necessary packages
  - b. Load the training and testing data
  - c. Define the network architecture using Keras
  - d. Train the model using SGD/Adam optimizer
  - e. Evaluate the network
  - f. Plot the training loss and accuracy
  
4. Implement the CNN model for classifying CIFAR10 image dataset by dividing the model into following 4 stages:
  - a. Loading and preprocessing the image data
  - b. Defining the model's architecture
  - c. Training the model
  - d. Estimating the model's performance
  
5. Implement anomaly detection for given credit card dataset using Autoencoder and build the model by using the following steps:
  - a. Import required libraries
  - b. Upload / access the dataset
  - c. Encoder converts it into latent representation
  - d. Decoder networks convert it back to the original input
  - e. Compile the models with Optimizer, Loss, and Evaluation Metrics
  
6. Implement the Continuous Bag of Words (CBOW) Model for the given (textual document 1) using the below steps:
  - a. Data preparation
  - b. Generate training data

- c. Train model
- d. Output

7. Implement the Continuous Bag of Words (CBOW) Model for the given (textual document 2) using the below steps:

- a. Data preparation
- b. Generate training data
- c. Train model
- d. Output

8. Implement the Continuous Bag of Words (CBOW) Model for the given (textual document 3) using the below steps:

- a. Data preparation
- b. Generate training data
- c. Train model
- d. Output

9. Object detection using Transfer Learning of CNN architectures for the given (image dataset 1) using the below steps:

- a. Load in a pre-trained CNN model trained on a large dataset
- b. Freeze parameters (weights) in model's lower convolutional layers
- c. Add custom classifier with several layers of trainable parameters to model
- d. Train classifier layers on training data available for task
- e. Fine-tune hyper parameters and unfreeze more layers as needed

10. Object detection using Transfer Learning of CNN architectures for the given (image dataset 2) using the below steps:

- a. Load in a pre-trained CNN model trained on a large dataset
- b. Freeze parameters (weights) in model's lower convolutional layers
- c. Add custom classifier with several layers of trainable parameters to model
- d. Train classifier layers on training data available for task
- e. Fine-tune hyper parameters and unfreeze more layers as needed

11. Object detection using Transfer Learning of CNN architectures for the given (image dataset 3) using the below steps:

- a. Load in a pre-trained CNN model trained on a large dataset
- b. Freeze parameters (weights) in model's lower convolutional layers
- c. Add custom classifier with several layers of trainable parameters to model
- d. Train classifier layers on training data available for task
- e. Fine-tune hyper parameters and unfreeze more layers as needed

12. Implementing Feedforward neural networks with Keras and TensorFlow

- a. Import the necessary packages
- b. Load the training and testing data (MNIST/CIFAR10)
- c. Define the network architecture using Keras
- d. Train the model using SGD

- e. Evaluate the network
- f. Plot the training loss and accuracy

13. Build the Image classification model by dividing the model into following 4 stages:

- a. Loading and preprocessing the image data
- b. Defining the model's architecture
- c. Training the model
- d. Estimating the model's performance

14. Use Autoencoder to implement anomaly detection. Build the model by using:

- a. Import required libraries
- b. Upload / access the dataset
- c. Encoder converts it into latent representation
- d. Decoder networks convert it back to the original input
- e. Compile the models with Optimizer, Loss, and Evaluation Metrics

15. Implement the Continuous Bag of Words (CBOW) Model. Stages can be:

- a. Data preparation
- b. Generate training data
- c. Train model
- d. Output

16. Object detection using Transfer Learning of CNN architectures

- a. Load in a pre-trained CNN model trained on a large dataset
- b. Freeze parameters (weights) in model's lower convolutional layers
- c. Add custom classifier with several layers of trainable parameters to model
- d. Train classifier layers on training data available for task
- e. Fine-tune hyper parameters and unfreeze more layers as needed